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EXAMINER

KIM, JUNG W

ART UNIT	PAPER NUMBER
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2132

DATE MAILED: 03/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/864,042	Applicant(s) ANANTH, VISWANATH	
	Examiner Jung W Kim	Art Unit 2132	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 January 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 and 30-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-26 and 30-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-26 and 30-32 have been examined. Applicant in the amendment filed on January 10, 2005 amended claims 1, 15, 18 and 20-23, added new claims 30-32, and canceled claims 27-29.

Response to Amendment

2. The objection to the specification is withdrawn as the amendment to the specification overcomes the objection.

Response to Arguments

3. The following is a response to the arguments presented by the applicants in the amendment filed on January 10, 2005.

4. Applicant's reply does not comply with the requirements of CFR 1.111(b), because applicant does not reply to every ground of objection and rejection to the prior Office action: no response was made to the 112, second paragraph rejection to claim 15.

5. Applicant's willingness to submit a terminal disclaimer to overcome the obviousness-type double patenting rejection when the claims as amended are in a condition for allowance is noted. In view of the amendments to the claims, a double patenting rejection is still warranted. Moreover, applicant is required to either cancel the

conflicting claims from all but one application or maintain a clear line of demarcation between the applications. See MPEP § 822.

6. Applicant's arguments with respect to the 103(a) rejections of claims 1-26 have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

7. Claim 22 is objected to because of the following informalities: the claim is not grammatical. Appropriate correction is required.

Claim Rejections - 35 USC § 112

8. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claims 18 and 19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

11. Claims 18 and 19 recite the limitation "the hybrid stream cipher". There is insufficient antecedent basis for this limitation in the claims.

12. Claim 15 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: the structural relationship between the memory (see line 2) and the logic to perform a stream cipher using an encryption key on input data segmented in random sized blocks (see lines 3-4); no relationship is established.

Double Patenting

13. Claims 1-8, 15-20, 22, 25 and 30-32 of this application conflict with claims 1-8, 12-14, and 17-19 of copending Application No. 09,904,962. 37 CFR 1.78(b) provides that when two or more applications filed by the same applicant contain conflicting claims, elimination of such claims from all but one application may be required in the absence of good and sufficient reason for their retention during pendency in more than one application. Applicant is required to either cancel the conflicting claims from all but one application or maintain a clear line of demarcation between the applications. See MPEP § 822.

14. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent

Art Unit: 2132

and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

15. Claims 1-8, 15-20, 22, 25 and 30-32 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-8, 12-14, and 17-19 of copending Application No. 09,904,962. Although the conflicting claims are not identical, they are not patentably distinct from each other because both sets of claims define a cipher comprising a routine to divide incoming plain text into variable-sized blocks and a routine converting the plain text into cipher text based on an encryption key and an internal identifier. The additional limitation of an internal state affecting the conversion routine defined in the aforementioned claims of copending Application No. 09,904,962 does not define a patentably distinct limitation since it is an inherent feature of a ciphering device.

16. This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 102

17. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

18. Claims 15-17 and 20-22 are rejected under 35 U.S.C. 102(e) as being anticipated by Barbir U.S. Patent No. 6,122,379 (hereinafter Barbir).

19. As per claims 15-17 and 20-22, Barbir discloses a computing device (figs. 3-8 and related text) comprising:

- a. a memory (fig. 3, reference no. 160); and
- b. logic to perform a stream cipher operation on input data segmented in random sized blocks using an encryption key (col. 7:22-45);

- c. wherein the stream cipher operation involves encryption (Abstract; 3:15-4:53);
 - d. wherein the logic is an integrated circuit (fig. 3, reference no. 140);
 - e. wherein the computing device is one of a smart card and a node coupled to a network and alternatively a router (figs. 1-3);
 - f. wherein the logic to segment the random sized blocks using the encryption key into a plurality of blocks including at least three successive blocks varying in length and wherein the logic to segment each of the random sized blocks varies the length for each block (fig. 4, reference no. 40; each new static stage size determines a successive block varying in length from previous block sizes).
20. The aforementioned cover the limitations of claims 15-17 and 20-22.

Claim Rejections - 35 USC § 103

21. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
22. Claims 1-5, 14, 18, 19 and 30-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barbir in view of Zhang U.S. Patent No. 6,154,541 (hereinafter Zhang).

23. As per claims 1-5, Barbir discloses a hybrid stream cipher operating within a computing device (figs. 3-8 and related text), comprising:

- g. a first software routine to divide incoming plain text into variable-sized blocks of which at least three blocks are divided with three different sizes (fig. 4, reference no. 40; each new static stage size determines a successive block varying in length from previous block sizes); and
- h. a second software routine to convert the plaintext into cipher text based on an encryption key (col. 7:22-45; fig. 5);
- i. wherein the first software routine produces the variable-sized blocks based on the encryption key (7:22-45);
- j. wherein each current block of the plain text is determined by producing a pseudo-random sequence using a second non-linear function including the encryption key as input and accessing contents of the pseudo-random sequence as a number of data elements of the plain text forming the current block (fig. 4, reference no. 40);
- k. wherein the second software routine further performs a first shuffling operation on an internal state of a computing device based on the encryption key so that a single bit modification of the encryption key requires complete recalculation of the internal state of the computing device (fig. 5).

24. Barbir does not expressly disclose incorporating a unique internal identifier and an output of a first non-linear function along with the encryption key for the production of the random-sized blocks; incorporating the unique internal identifier as inputs to the

second non-linear function to produce the pseudo-random sequence; wherein the second software routine further performs a second shuffling operation on the internal state of the computing device based on the encryption key and the internal identifier to mitigate a likelihood of prediction of the internal state of the computing device upon knowledge of the encryption key. Zhang teaches incorporating efficient methods to secure a cipher system by multi-seeding and re-seeding, wherein multiple values, including an identifier from a source, are incorporated using a non-linear function combined with other seeds to establish a randomizing function. Zhang, 21:43-22:47, especially 22:19-36. It would be obvious to one of ordinary skill in the art at the time the invention was made for the hybrid stream operation processed by the logic to produce random-sized blocks of the input data based on the encryption key, an unique internal identifier and an output of a first non-linear function, wherein each block of the plain text is determined by the hybrid stream cipher producing a pseudo-random sequence using a second non-linear function including the encryption key, the internal identifier and the output of the first non-linear function as inputs; and wherein the second software routine further performs a second shuffling operation on the internal state of the computing device based on at least the internal identifier to mitigate a likelihood of prediction of the internal state of the computing device upon knowledge of the encryption key, since multi-seeding and re-seeding and any combination thereof to generate functions of the cryptosystem enables a more secure cryptosystem. Zhang, 21:65-22:8. The aforementioned cover the limitations of claims 1-5.

25. As per claim 14, the rejections of claims 1-5 under 35 U.S.C. 103(a) are incorporated herein. In addition, Barbir discloses encrypting and decrypting data via a table lookup having arrays of data elements. Barbir, col. 8:45-53; 9:36-67. Further, a table lookup for decrypting ciphertext uses an array having data elements that are permuted to correspond to an inverse of an array used to encrypt the original plaintext. The aforementioned cover the limitations of claim 14.

26. As per claims 18 and 19, the rejections of claims 15-17 and 20-22 under 35 U.S.C. 102(e) are incorporated herein. In addition, Barbir discloses the hybrid stream operation processed by the logic produces random-sized blocks of the input data based on the encryption key, wherein each block of the plain text is determined and segmented by the hybrid stream operation producing a pseudo-random sequence using a second non-linear function including the encryption key as inputs and accessing contents of the pseudo-random sequence as a number of data elements of the plain text forming the current block. Barbir, col. 7:22-45; figs. 4 and 5. Barbir does not expressly disclose incorporating a unique internal identifier and an output of a first non-linear function along with the encryption key for the production of the random-sized blocks, and further incorporating the unique internal identifier as inputs to the second non-linear function to produce the pseudo-random sequence. Zhang teaches incorporating efficient methods to secure a cipher system by multi-seeding and re-seeding, wherein multiple values, including an identifier from a source, are incorporated using a non-linear function combined with other seeds to generate random values.

Zhang, 21:43-22:47, especially 22:19-36. It would be obvious to one of ordinary skill in the art at the time the invention was made for the hybrid stream operation processed by the logic to produce random-sized blocks of the input data based on the encryption key, an unique internal identifier and an output of a first non-linear function, wherein each block of the plain text is determined by the hybrid stream operation producing a pseudo-random sequence using a second non-linear function including the encryption key, the internal identifier and the output of the first non-linear function as inputs, since multi-seeding and re-seeding and any combination thereof enables a more secure cryptosystem. Zhang, 21:65-22:8. The aforementioned cover the limitations of claims 18 and 19.

27. As per claims 30-32, the rejections of claims 18 and 19 under 35 U.S.C. 103(a) are incorporated herein. In addition, the computing device is disclosed as software routines wherein the plaintext is divided into variable-sized blocks with each block varying in size. Barbir, fig. 3, reference no. 160, 'Compression and Encryption tables'; fig. 4, reference no. 40. The aforementioned cover the limitations of claims 30-32.

28. Claims 6-9 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barbir in view of Zhang, and further in view of Moskowitz et al. U.S. Patent No. 5,822,432 (hereinafter Moskowitz).

29. As per claims 6, 7 and 9, the rejections of claim 1-5 under 35 U.S.C. 103(a) are incorporated herein. Barbir does not disclose a third software routine to determined if a plurality of random data elements are to be distributed within the cipher text, wherein the third software routine determines an amount of random data elements distributed within the cipher text is programmable based on a percentage value entered by a user, or set based on the encryption key and internal identifier and the internal state of the hybrid stream cipher, wherein the plurality of random data elements are produced by a pseudo-random generator. Moskowitz teaches a method of inserting random values into a digital stream, which are based on human interactive input information, including a percentage value, by mapping these values into the digital stream wherein a pseudo-random key is used to identify the locations of the random values. See Moskowitz, Abstract; Figure 1 and related text; col. 5:6-65; claims 1, 4, 23-30. It would be obvious to one of ordinary skill in the art at the time the invention was made for the cipher to include a third software routine to determined if a plurality of random data elements are to be distributed within the cipher text, wherein the third software routine determines an amount of random data elements distributed within the cipher text is programmable based on a percentage value entered by a user, or set based on the encryption key and internal identifier and the internal state of the hybrid stream cipher, wherein the plurality of random data elements are produced by a pseudo-random generator, since it affords greater flexibility to a user of the system to adaptively change the parameters on the insertion of a watermark, thereby enabling the user to minimize the footprint while

maximizing the security of the watermark. Moskowitz, 2:31-55. The aforementioned cover the limitations of claims 6, 7 and 9.

30. As per claim 8, the rejection of claim 6 under 35 U.S.C. 103(a) is incorporated herein. Moskowitz discloses the amount of random data elements distributed within the cipher text is programmable based on a percentage entered by a user, but does not disclose that the amount of random data elements distributed within the cipher text is based on the encryption key, the internal identifier and the internal state of the hybrid stream cipher. Zhang teaches multi-seeding and re-seeding techniques to generate a randomizing function for a cipher system. Zhang, col. 21:43-22:36. Moreover, the randomization function is deterministic to enable an inverse operation; hence, the output of the randomizing function is based on values corresponding to the known state of the cipher. As such, values such as the encryption key and the internal identifier are obvious seeds in combination with the internal state of the computing device to generate the amount of random data elements to be distributed within the cipher text. It would be obvious to one of ordinary skill in the art at the time the invention was made for the amount of random data elements distributed within the cipher text to be based on the encryption key, the internal identifier and the internal state of the hybrid stream cipher. One would be motivated to do this to automatically generate a random but deterministic value as known to one of ordinary skill in the art. Zhang, *ibid.* The aforementioned cover the limitations of claim 8.

31. As per claim 25, the rejections of claims 6-9 under 35 U.S.C. 103(a) are incorporated herein. In addition, a corresponding decryption method is taught. See Barbir, col. 9:37-67; see Zhang, 21:54-55; see Moskowitz, 8:27-65, claims 1-10. The aforementioned cover the limitations of claim 25.

32. Claims 10-13 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barbir in view of Zhang, and further in view of Schneier Applied Cryptography (hereinafter Schneier).

33. As per claim 10, the rejections of claims 1-5 under 35 U.S.C. 103(a) are incorporated herein. Barbir does not disclose a routine to map the input plain text before undergoing operations of the second software routine to avoid statistics of the plain text from reflecting an internal state of the computing device. Schneier discloses techniques, such as whitening and permuting, to obfuscate the input of an algorithm. Schneier, pg. 367, 1st and 2nd paragraphs; pg. 271, 'The Initial Permutation'. Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to map the input plain text before undergoing operations of the second software routine so as to further obfuscate the distinct portions of the input stream as taught by Schneier. Ibid. The aforementioned cover the limitations of claim 10.

34. As per claim 11, the rejections of claims 1-5 under 35 U.S.C. 103(a) are incorporated herein. Barbir does not disclose adding a hash digest of a portion of the

output stream to the output stream. Schneier teaches using hash digests to fingerprint digital data to allow for future validation of its authenticity. It would be obvious to one of ordinary skill in the art at the time the invention was made for the output stream to include a hash digest to enable future verification of the authenticity of the digital stream. Schneier, pg. 31, first paragraph.

35. Further, Barbir does not expressly disclose mixing the hash digest with the cipher text and the plurality of random data. Schneier further discloses techniques, such as whitening and permuting, to further obfuscate the output of an encryption function. Schneier, pg. 367, 1st and 2nd paragraphs; pg. 275, 'The P-Box Permutation'. These functions, when applied to the output stream comprising the cipher text, the plurality of random data elements and the hash digest, effectively mixes the three components. Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made for a third software routine to produce an output stream based on a mixing of the cipher text, a plurality of random data elements and a hash digest of a portion of the output stream so as to further obfuscate the distinct portions of the output stream as taught by Schneier. Ibid. The aforementioned cover the limitations of claim 11.

36. As per claims 12 and 13, the rejection of claim 11 under 35 U.S.C. 103(a) is incorporated herein. Barbir does not disclose distributing a digital signature in the cipher text. Schneier teaches digital signatures as a means to verify the integrity of a digital stream. Schneier, pg. 35, 5 characteristics of a digital signature. It would be obvious to one of ordinary skill in the art at the time the invention was made to distribute

a digital signature in the cipher text in order to detect modification. Schneier, pg. 35, 4th characteristic of a digital signature. The aforementioned cover the limitations of claims 12 and 13.

37. As per claim 26, the rejections of claims 10-13 and 25 under 35 U.S.C. 103(a) is incorporated herein. In addition, a method incorporating digital signatures as a secure technique to transmitted digital data necessarily includes steps to verify the digital signature upon reception of the digital data and to take measures dependent on the success or failure of the verification of the digital signature. Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to verify a digital signature of a distributed cipher text and abort decryption if verification fails to ensure restricted digital content can only be read by authorized users as known to one of ordinary skill in the art. The aforementioned cover the limitations of claim 26.

38. Claims 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barbir in view of Schneier.

39. As per claims 23 and 24, the rejection of claim 15 under 35 U.S.C. 102(e) is incorporated herein. Barbir does not expressly disclose the computing device is one of an operating system and a wireless device, wherein the memory of the computing device is a portable storage medium that, only when in communication with the logic, enables the logic to perform the stream cipher operation on the random-sized block.

Schneier teaches incorporating cipher systems on a smart card, wherein the smart card is a portable storage medium, has an operating system and is tamper resistant. See Schneier, pg. 587, 'Smart Cards'. It would be obvious to one of ordinary skill in the art at the time the invention was made for the computing device to be one of an operating system and a wireless device, wherein the memory of the computing device is a portable storage medium that, only when in communication with the logic, enables the logic to perform the stream cipher operation on the random-sized block, since smart cards affords a portable but secure means of housing the computing device as taught by Schneier, *ibid*. The aforementioned cover the limitations of claims 23 and 24.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jung W Kim whose telephone number is (571) 272-3804. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gilberto Barron can be reached on (571) 272-3799. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

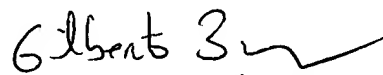
Art Unit: 2132

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Jung W Kim
Examiner
Art Unit 2132

Jk
March 18, 2005



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